

### **REMARKS**

Claims 57-64, 68-73 and 75 are cancelled; claims 65-67 and 74 are amended; new claim 78 is added; and claims 65-67, 74 and 78 are pending in the application.

The pending claims stand rejected as being obvious over Aoki. Applicant disagrees, and requests reconsideration of such rejections.

Referring first to claim 65, such recites a monocrystalline silicon substrate having a roughened platinum layer formed thereover, and further recites an intervening layer between the platinum layer and the substrate. The intervening layer comprises at least one of iridium, rhodium, ruthenium, platinum, palladium, osmium, silver, rhodium/platinum alloy,  $\text{IrO}_2$ ,  $\text{RuO}_2$ ,  $\text{RhO}_2$ , or  $\text{OsO}_2$ . Claim 65 is allowable over Aoki for at least the reason that the reference does not disclose or suggest all of the recited features of claim 65.

Aoki does not, for example, disclose or suggest the claim 65 recited provision of an intervening layer between a roughened platinum layer and a monocrystalline silicon substrate. The Examiner contends that Aoki's layer 40 corresponds to Applicant's recited intervening layer. The Examiner is mistaken. Referring to Aoki's Fig. 1d, layer 40 is not between a platinum layer and a monocrystalline substrate. For at least this reason, Aoki's layer 40 does not constitute the claim 65 recited intervening layer. As Aoki does not disclose or suggest the claim 65 recited intervening layer, claim 65 is allowable over Aoki. Applicant therefore requests such allowance in the Examiner's next action.

Claims 66, 67 and 78 depend from claim 65 and are therefore allowable for at least the reasons discussed above regarding claim 65. Applicant notes that new claim 78 is supported by the originally-filed application at, for example, page 9, lines 10 and 11; and therefore does not comprise "new matter".

Referring next to claim 74, such recites a capacitor having a first capacitor electrode and a second capacitor electrode, and wherein both of the first and second capacitor electrodes comprise roughened platinum having recited columnar pedestals.

Claim 74 is allowable over Aoki for at least the reason that Aoki does not disclose or suggest all of the recited features of claim 74. The Examiner recognizes that Aoki does not disclose any capacitor structure wherein both a first capacitor electrode and a second capacitor electrode comprise roughened platinum. Instead, the only capacitor structures disclosed in Aoki are structures which comprise one electrode which is roughened (see, for example, electrode 38 of Fig. 1d) and a second electrode which is not roughened (see, for example, electrode 37 of Fig. 1d). It is inconceivable that a reference which only teaches capacitor constructions in which a capacitor electrode is not roughened can suggest constructions having all of the capacitor electrodes roughened. The Examiner contends that it would be obvious to modify Aoki to form a pair of roughened capacitor electrodes in the interest of increasing capacitance. Applicant submits that Aoki's process for forming a roughened capacitor electrode is a complex process designed to work in roughening the upper surface of a

capacitor electrode prior to provision of dielectric material over such electrode. There is no teaching or suggestion in Aoki that the process can somehow be applied to a top electrode of a capacitor construction. Specifically, there is no teaching or suggestion that Aoki's process utilized for roughening the lower electrode 38 could somehow also be utilized for roughening upper electrode 37. The Examiner's statement that it would be obvious to roughen upper electrode 37 to increase capacitance, implies that the Examiner intends for a lower surface of electrode 37 (i.e., the surface adjacent dielectric material 40) to be roughened. There is no teaching or suggestion in Aoki that the process disclosed therein can be utilized to roughen a lower surface of upper electrode 37, and it is difficult to see how the complicated processing of Aoki could be utilized for forming such roughened lower surface. The Examiner is therefore mistaken in contending that it would be obvious to modify the disclosure of Aoki to form the claim 74 recited capacitor construction having a pair of roughened electrodes. For at least this reason, claim 74 is not obvious over Aoki, and Applicant therefore requests allowance of claim 74 in the Examiner's next action.

Pending claims 65-67, 74 and 78 are allowable over Aoki for the reasons discussed above.

The pending claims stand rejected for double patenting relative to claims 1-20 of Patent No. 5,990,559. Submitted herewith is a Terminal Disclaimer which overcomes such obviousness-type double patenting rejection. Applicant

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therefore requests withdrawal of the obviousness-type double patenting rejection in the Examiner's next action.

Pending claims 65-67, 74 and 78 are allowable for the reasons discussed above, and Applicant therefore requests formal allowance of such pending claims in the Examiner's next action.

Respectfully submitted,

Dated: \_\_\_\_\_

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By: \_\_\_\_\_



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Assignee .... Micron Technology, Inc.  
Group Art Unit .... 2811  
Examiner .... H. Vu  
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Title: Circuitry and Capacitors Comprising Roughened Platinum Layers

VERSION WITH MARKINGS TO SHOW CHANGES MADE ACCOMPANYING  
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In the Claims

The claims have been amended as follows. Underlines indicate insertions  
and ~~strikeouts~~ indicate deletions.

Cancel claims 57-64, 68-73 and 75.

65. (Once Amended) ~~The circuit of claim 61 further comprising~~ An  
integrated circuit comprising:

a monocrystalline silicon substrate;

a roughened platinum layer over the substrate, the roughened platinum  
layer having a continuous surface characterized by columnar pedestals that are  
at least about 300Å tall; and

an adhesion intervening layer between the platinum layer and the substrate,  
the adhesion intervening layer comprising at least one of titanium nitride, iridium,

rhodium, ruthenium, platinum, palladium, osmium, silver, rhodium/platinum alloy, IrO<sub>2</sub>, RuO<sub>2</sub>, RhO<sub>2</sub>, or OsO<sub>2</sub>.

66. (Once Amended) The circuit of claim 64 65 wherein the pedestals terminate in dome-shaped tops.

67. (Once Amended) The circuit of claim 64 65 wherein the pedestals terminate in hemispherical tops.

74. (Once Amended) ~~The capacitor of claim 72 wherein both capacitor electrodes comprise roughened platinum layers~~ A capacitor comprising:  
a first capacitor electrode over a monocrystalline silicon substrate;  
a second capacitor electrode;  
a dielectric layer between the first and second capacitor electrodes;  
wherein both of the first and second capacitor electrodes comprise roughened platinum, the roughened platinum having a continuous surface characterized by columnar pedestals having heights greater than or equal to about one-third of a total thickness of the roughened platinum.

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